What is claimed is:

1. A metal insulator semiconductor field effect type semiconductor device, comprising:

a semiconductor substrate having first and second main surfaces which are opposite to each other;

a trench formed in said semiconductor substrate to give a predetermined depth from the first main surface, said trench separating said first surface of said semiconductor substrate into plural semiconductor island regions for forming metal insulator semiconductor field effect type cells, respectively;

a source region, a channel forming region and a drain region formed in the order of mention in the depth direction of said semiconductor island region from said first main surface of each said semiconductor island region;

a gate insulating film formed over the inside surface of said trench, said gate insulating film having an end portion formed on said first main surface at the periphery of said trench; and

a gate electrode formed over said gate insulating film so as to embed the trench therewith, said gate electrode being disposed over the end portion of said gate insulating film and extending from inside of said trench toward the periphery of said trench.

2. A metal insulator semiconductor field effect type semiconductor device according to claim 1, wherein said gate electrode extends along said trench.

3. A metal insulator semiconductor field effect type semiconductor device according to claim 1, wherein said gate electrode is made of polycrystalline silicon and said gate insulating film is made of silicon oxide.

4. A metal insulator semiconductor field effect type semiconductor device, comprising:

a semiconductor substrate having first and second main surfaces which are opposite to each other;

a trench formed in said semiconductor substrate to give a predetermined depth from the first main surface, said trench separating said first main surface of said semiconductor substrate into plural semiconductor island regions for forming metal insulator semiconductor field effect type cells;

a gate electrode formed, via an insulating film, to cover both the inside surface of said trench and said first main surface at the periphery of said trench; and

a source region, a channel forming region and a drain region formed in the mention of order in the depth direction of each the semiconductor island region from the first main surface of the semiconductor island region.

5. A method for fabricating a trench-gate type

semiconductor device, comprising the steps of:

providing a semiconductor substrate having a main surface,

forming an insulating film over the main surface of said semiconductor substrate,

patterning said insulating film into a pattern corresponding to a trench to be formed,

etching the main surface of said semiconductor substrate by using said insulating film as a mask to form a trench in said semiconductor substrate, thereby defining a semiconductor island region,

etching the side surface of the trench pattern of said insulating film to enlarge the trench pattern of said insulating film, thereby exposing the main surface of said semiconductor substrate at the periphery of said trench,

forming a gate oxide film over the surfaces inside and at the periphery of the trench of said semiconductor substrate by using the insulating film as a mask, and

forming a gate conductive layer over said gate insulating film inside and at the periphery of said trench.

6. A method according to claim 5, wherein said gate conductive layer is made of polycrystalline silicon and said gate insulating film is made of silicon oxide.

7. A method according to claim 5, further comprising the steps of, subsequent to the step for forming the gate

conductive layer:

introducing impurities into said semiconductor island region to form therein a channel forming region, and

introducing impurities into said semiconductor island region to form therein a source region.